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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/788,556	Applicant(s) BEYER ET AL.	
	Examiner Helene R. Rose	Art Unit 2163	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-47 and 50-88 is/are pending in the application.
- 4a) Of the above claim(s) 48-49 and 89-90 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-47 and 50-88 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on February 27, 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

1. Claims 1-90 are pending; Claims 1-5, 7-47 and 50-88 have been amended; Claims 48-49 and 89-90 have been cancelled; No new claims were added.
2. Applicant's arguments, filed on 7/28/2006, with respect to claims 1-90 have been considered, but are not persuasive.

Claim Objections

3. In view of Claims 9 and 11-36, 38-39, 60-85, and 87-88 being objected to because of the following informalities in reference to parentheses such as: capturing (b), determining (c), and communicating (d) and so forth stated at the beginning of each claim limitation. Examiner withdraws the pending objection due to the amendments of claims to overcome objection.
4. Claims 1, 12-18, 20-23, 26-28, 61-62, 65-71, and 75-77 are objected to because of the following informalities: Claims 1, 12-18, 20-23, 26-28, 61-62, 65-71, and 75-77, since the claim limitations stated within the claim are indicated separately and not combined in a paragraph format per se, indicates that each claim limitation defines a point, i.e. bullet, therefore, the comma, after each claim limitation must be replaced with a semi-colon and all "response to" must have a colon after the limitation, such as "responsive to:", wherein responses to acts as a "if" statement. Appropriate correction is required.

Examiner notes that this rejection still stands, as claims still contains errors.

Claim Rejections – 35 U.S.C- 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
6. In view of the rejection to Claims 10, 14, 20, 22-23, 25-28, 32-33, 35-36, 38-39, 59, 63, 69, 71-72, 74-77, 81-82, 84-85, and 87-88 being rejected under 112, second paragraph. because of the following

limitation “or”, rendering the claim vague and indefinite. Examiner withdraws this rejection based on how it is conveyed within applicant’s specification.

7. In view of the rejection to Claims 12-28, 30-33, 36, 48-49, 61-77, 79-82, and 85 being rejected under 112, second paragraph due to the following limitation “if”. Examiner withdraws this rejection due to the amendments of claims to overcome rejection.

8. Claims 1-39 and 50-87 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 50, recite the limitation “at least in part” renders the claim indefinite because neither the claim nor the specification explains what “at least in part” means. It is difficult for the examiner to interpret the claim not knowing how the limitation “at least in part” constitutes. Claims 2-39 and 50-87 are also rejected by virtue of their dependency to claims 1 and 50.

Claim Rejections – 35 U.S.C 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-5, 7-47, and 50-88 are rejected under 35 U.S.C. 102(b) as being anticipated by Jain et al (US Patent No. 5,806,075, Date of Patent: September 8, 1998).

Claims 1 and 50:

Regarding claims 1 and 50 discloses a computer-implemented method/computer readable medium, **utilizing** the same functionality/claim limitations, **Jain** teaches a computer-implemented method/computer readable medium for providing convergence of **multiple copies of a table to a same state** in a database system (Figure 1, all features, illustrates computerized systems containing one or more locations containing copies of data, Jain), the database system including a plurality of nodes **each having a corresponding copy of the table, the method** (Figure 3, illustrates a plurality of replication tables, Jain), comprising:

for each row of each table copy (Figures 8A and 8B, all features and defined in column 17, lines 7-53, wherein applicant specification paragraph [0026] to be each row of each table copy is augmented with additional information used to facilitate the convergence of replicated data and wherein FIG. 2 illustrates an embodiment of a table copy row with the additional information in accordance with the present invention and the additional information comprises a Timestamp 201, a CopyId 202, CopyDelete flag 203, and an ImplicitDelete flag 204, Jain);

associating a timestamp with the row, the timestamp indicating a time when a change to the row has occurred (Figure 10, wherein commit time is defined, and wherein it illustrates the state of replication tables after queue_transactional_DRPC has processed the replicated procedure information and column 18, lines 51-53, wherein any changes made to the tables at the DbA site must be replicated at the DbB site and vice versa, Jain);

associating a copy identification to the row, the copy identification being an identifier that uniquely identifies the table copy to which the row belongs (Figure 10, all features, wherein the figure is defined in column 19, lines 17-33, wherein identifies a replicated procedure, wherein the transaction table is populated with a transaction identifier to identify the order processing transaction, wherein the

transaction nodes table has one entry for the remote copy of the inventory orders tables located in DbB, wherein the entry is equivalent to the row, Jain); and

associating propagation controls with the row (column 20, lines 17-25, wherein the entry is deleted from the replication tables; column 21, lines 53-56, wherein deleted from the call nodes table; column 22, lines 20-22, wherein it provides the ability for an application to identify conflicts within one of its procedures, lines 24-25, wherein when a conflict is detected, information regarding the conflict can be identified and stored in the exceptions table and wherein applicant specification, paragraph [0059], propagation controls comprise a delete label and a conflict label and the delete label indicates that a deleted row should not be communicated to the other table copies and the conflict label indicates that a row delete should be communicated to the other table copies, Jain), **the propagation controls indicating whether a change to the row should be communicated to other table copies based at least in part on the timestamp of the change or the copy identification associated with the row** (Figure 11B, all features, wherein the figure is defined in column 21, lines 46-60 and column 22, lines 1-14, Jain);

asynchronously capturing a change to a row of a **given table copy** from a database recovery log (column 7, lines 7-36, wherein recovery log, i.e. redo log contains undo information, wherein information that can be used to roll back changes made to data after an event, such as system failure, when such error occurs the transactional updates made prior to the error, must be undone to maintain the data integrity in existence prior to the updates and although the redo log the redo log was not designed for capturing modification information for propagation to a second database system and when the log is used for its intended purpose as well as a resource for data replication, a storage management problem arises, because a redo log that it used to retain propagation information can never be moved off-line, i.e., made inaccessible to the database system which is **equivalent** to capturing a change to a row of a given table copy and provides a propagation

identification capability that can be managed in the same way as any other table, or relation, managed by a database administrator and the ability to encode the propagation information in tables in the database system and the information stored in these tables can be retrieved as any other data within the database system, and can be accessed at any time, which is also **equivalent** to capturing a change, Jain), **the database recovery log containing an entry that describes the change to row of the given table copy** (column 7, lines 65-67, Jain);

determining that the captured change to the row of the given table copy is to be communicated to other table copies in the database system, the determination being made in accordance with the indication of the propagation controls associated with the change row of the given table copy; (column 7, lines 37-45, wherein data modification to other data sites, and wherein the tables include transactions; transaction nodes, call, call-nodes, and exceptions; column 18, lines 27-46, Jain);

communicating the captured change to the other table copies in the database system (column 18, lines 46-53, wherein application that use user procedure level replication to replicate its logical operations to other sites, wherein the application assumes the relation, i.e. tables, described in Figures 2A-2D and column, 7, lines 50-64, wherein the transaction table contains information that are performed on the data and that use deferred remote procedure calls, i.e. DRPC's, such as transaction identifier, i.e. transaction_id, delivery order number, i.e. DON, start time, deferring user identifier, and destination list, Jain); and

applying the communicated change to the other table copies in the database system (column 6, lines 65-66, Jain), wherein each table copy in the database system converges to a same state (column 18, lines 51-53, Jain).

Claims 2, 41, and 51:

Regarding claims 2, 41, and 51, teaches wherein the **timestamp comprises a monotonic number having a non-decreasing time value**, wherein the time values for each of the **table copy** is in a common

time base (Figure 3, wherein transaction table is illustrated, and within that table defines a start time for each transaction, wherein this is interpreted to be a non-decreasing time, Jain).

Claims 3, 42, and 52:

Regarding claims 3, 42, and 52, Jain teaches wherein **associating a timestamp with the row includes associating the timestamp with the row** in response to a user-induced change of the row (column 8, lines 6-14, wherein the time field is interpreted to be the monotonic number, i.e. timestamp as defined in applicant specification on page 17, line 3, wherein it reflects the time that the transaction was started, deferring the user field identifies the user who initiated the deferred transaction procedure call, Jain).

Claims 4, 43, and 53:

Regarding claims 4, 43, and 53, Jain teaches wherein the copy **identification uniquely identifying each table copy has** an ordering property (Figure 2B-2C and 2D1-2D2, all features, wherein ordering property is defined, Jain).

Claims 5, 44, and 54:

Regarding claims 5, 44, and 54, Jain teaches wherein **associating a copy identification to the row includes associating the copy identification to the row** in response to a user induced change of the row (column 11, lines 10-19, wherein the order of modifications is crucial, the DON, i.e. document order number can be used to retain the modification order and the DON field is assigned a original transaction, the time field of the new transaction table entry is set to the current time, the deferring user identifier is assigned the value of the user that originated the original transaction, Jain)

Claims 6, 45, and 55:

Regarding claims 6, 45, and 55, Jain teaches wherein the propagation controls comprise a delete label and a conflict label (column 6, lines 57-63, wherein a trigger is a procedure that is executed when a

modification, e.g. update, insert, or delete, occurs to a row in table and column 22, lines 18-22, wherein identify conflicts of procedures is defined, Jain).

Claims 7, 46, and 56:

Regarding claims 7, 46, and 56, Jain teaches wherein the delete label indicates that a row delete in **a given table copy is not to be communicated to other table copies in the database system** (column 16, lines 28-32, wherein the remote table entry is deleted from the remote table, after the delete replication variable is reset at processing block, and wherein the processing ends at block, i.e. interpreted to be the plurality of table copies, Jain).

Claims 8, 47, and 57:

Regarding claims 8, 47, and 57, Jain teaches wherein the conflict label indicates that an implicit row delete in **a given table copy is to be communicated to other table copies in the database system, an implicit row delete being a deletion of a row due to a conflict** (column 14, lines 22-26 and column 22, lines 7-14, Jain).

Claims 9 and 58:

Regarding claims 9, 58, Jain teaches wherein **asynchronously capturing a change to a row of a given table copy** comprises:

accessing **the** entry of the database recovery log pertaining to the change **of the row** (column 8, lines 38-43, wherein transaction is to be executed to replicate changes made by the transaction on the local data site and transaction_id can be used to access an entry in the transaction table, Jain);

determining a type of **change to the row**; (column 8, lines 55-61, wherein procedures can be defined without being a part of a transaction and information regarding a either type of procedure is retained in the calls table, the calls table contains a unique identifier, call identifier, i.e. call_id, that can order a call within a transaction, Jain);

extracting old column values and new column values of the **row** from the **entry in the** database recovery log (column 14, lines 3-14, wherein the old values, or a subset, uniquely identify the row that is the target of the modification, and wherein the update operation is performed, the old values would be use to detect conflicts, and wherein the old value of the local data and the current values at the remote site may indicate that separate operation has been performed, Jain); and

extracting changed key column values and unchanged key column values **associated with the row** from the **entry in the** database recovery log (column 17, lines 57-63, wherein concurrent updates are made to disjoint sets, wherein in disjoint sets is interpreted to be a method of extracting, of non primary key columns, lost updates are prevented only when the updates are to columns whose values have been changed, i.e. those column changed at the originating sites as indicated by a difference between the old_value and new_value parameters and column 15, lines 23-25, wherein concurrent modifications to disjoint sets of non-primary field values can be permitted, Jain).

Claims 10 and 59:

Regarding claims 10 and 59, Jain teaches wherein the type of change **to the row** comprises a row insert (Figure 5A, diagram 504, Jain), a row delete (Figure 5C, diagram 574, Jain), a non-key update (column 15, lines 23-28, wherein non-primary field values is interpreted to be the non-key update, Jain), **or** a key update (Figure 5C, diagram 564, wherein row entry to be update using primary key value, e.g. subset of old values, and wherein < table_name > delete, i.e. old_values, illustrated at the top of Figure 5C as well is defined as the executing point, as defined in applicant specification on page 35, lines 6-7, states the key update is modeled as a deletion of the row with the old key value and insertion of a row with the new key, Jain).

Claims 11 and 60:

Regarding claims 11 and 60, Jain teaches wherein the determining **that the captured change to the row of the given table copy is to be communicated to other table copies in the database system** comprises:

examining **the type of change to the row if the given table copy**, the copy identification associated with the row of the given table copy, and the propagation controls associated with the row of the given table copy (REFER to claim 49, wherein this limitation has been addressed, Jain), wherein the propagation control values comprises a delete label and a conflict label (REFER to claim 6, wherein this limitation has been addressed, Jain)

Claims 12 and 61:

Regarding claims 12 and 61, Jain teaches wherein the determining further comprises:

determining that the captured change **to the row of the given table copy** is to be communicated to **other table copies in the database system responsive to,**

the type of **change to the row being a row insert** (Figure 5B1, diagram 534 and 5BC, diagram 570, wherein each field value is equal to its corresponding, or not equal to the corresponding new_value parameter, Jain); and

the copy identification associated with the row being the same as a copy identification assigned to the given table copy (column 11, lines 1-7, wherein a current transaction identifier is assigned to the transaction to be stored in the tables, the current transaction is assigned a value that will uniquely identify the table entry, Jain).

Claims 13 and 62:

Regarding claims 13 and 62, Jain teaches wherein determining **that the captured change to the row of the given table copy is to be communicated to other table copies in the database system** further comprises:

determining that the captured change **to the row if the given table copy** is to be communicated to **other table copies in the database system responsive to**, the type of change to the row being a row delete (Figure 5C, diagram 574, Jain) and the delete label associated with the row indicating that the captured change is to be communicated to **the other table copies in the database system** (column 16, lines 28-32, wherein the delete operation is performed on the remote table, the global replication variable is reset at processing block, Jain).

Claims 14 and 63:

Regarding claims 14 and 63, Jain teaches wherein determining **that the captured change to the row of the given table copy is to be communicated to other table copies in the database system** further comprises:

determining that the captured change **to the row of the given table copy** is to be communicated to **other table copies responsive to**, the type of change to the row being a non-key update (column 15, lines 27-28, wherein updates can be applied to non-primary fields, and Figure 11A and 11B, all features, illustrates a execution of transactional interpreted to be primary key transactions, non-transactional procedures interpreted to be non-primary transactions, Jain) or a key update (column 16, lines 53-55, wherein assigned to the inventory update transaction, wherein transaction_id is the primary key for the transaction table defined in column 7, lines 60-63, Jain) ;

neither the delete label nor the conflict label **associated with the row** indicates that the captured change is **not** to be communicated **to other table copies in the database system** (columns 21-22, lines 63-67, and liens 1-4, wherein updates that have occurred to a remote copy to the date may be lost, if the replicated modifications overwrites the current values in the remote copy, wherein the ability to communicate an exception to rollback any changes to a data copy after an exception is detected, Jain);
and

a new copy identification **associated with the row being the same as the** copy identification assigned to **the given** table copy (column 22, lines 32-39, wherein the exceptions table further contains the call identifier of the current calls table entry being processed along with the destination node, i.e. remote copy location, Jain).

Claims 15 and 64:

Regarding claims 15 and 64, Jain teaches wherein communicating **the captured change to the other table copies in the database system** comprises:

sending information for **associated with** the captured change to the **other** table copies in the **database system** (column 7, lines 38-43, wherein DRPC, i.e. deferring remote process control is interpreted to be sending, wherein DRPC is implementing the client server model of distributing computing, which is a request is sent to a remote system to execute a designated procedure using arguments supplied and a result returned to the caller, Jain), wherein **responsive to the type of change to the row being a row insert** (column 14, lines 16-18, Jain), the information **associated with the captured change** comprises key column values (column 17, lines 26-32, wherein the values are defined, Jain), non-key column values (column 17, lines 59-61, wherein non-primary key columns, and updates are to columns whose values have been changed, Jain), a **timestamp** (REFER to claim 49, wherein this limitation has been addressed, Jain), and a copy identification **associated with the row of the given table copy** (column 18, lines 51-53, wherein any changes made to the tables at the DbA site must be replicated at the DbB site, and vice versa, Jain).

Claims 16 and 65:

Regarding claims 16 and 65, Jain teaches wherein communicating **the captured change to the other table copies in the database system** comprises:

sending information **associated with** the captured change to the **other** table copies in the **database system**, wherein **responsive to the captured change type of change to the row being a row**

delete (Figure 5C, diagram 574, Jain), the information **associated with the captured change** comprises key column values (REFER to claims 15 and 64, wherein this limitation has been addressed, Jain), a **timestamp** (see claim 49, wherein this limitation has already been addressed, Jain), and a copy identification **associated with the row of the given table copy** (REFER to claims 16 and 65, wherein this limitation has already been addressed, Jain).*

Claims 17 and 66:

Regarding claims 17 and 66, Jain teaches wherein communicating **the captured change to the other table copies in the database system** comprises:

sending information for **associated with the captured change to the other table copies in the database system**, wherein **responsive to the type of change being** a non-key update (column 6, lines 57-61, wherein the trigger is interpreted to be the capture, and wherein trigger is a procedure that is executed when a modification occur to a row in a table, column 12, lines 58-64, wherein trigger is initiated when any modification operation is performed on table, an operation that is performed on a remote data entry will result in the initiation of a second trigger, and wherein defined in the applicant specification on page 23, lines 10-12, wherein non-key or key update is setting the copying identification of the updated row in the target table copy to the copy identification received with the communicated change, Jain), the information **associated with the captured change** comprises key column values (column 17, lines 26-32, Jain) wherein values are defined, Jain), new non-key column values (column 17, lines 26-32, wherein new values is defined, Jain), an old **timestamp** (column 4, line 8, Jain), a new **timestamp** (column 4, line 8, Jain), an old copy identification (column 6, 35-44, Jain), and a new copy identification **associated with the row of the given table copy** (column 6, 45-49, Jain).

Claims 18 and 67:

Regarding claims 18 and 67, Jain teaches wherein communicating **the captured change to the other table copies in the database system** comprises:

sending information for **associated with** the captured change to the **other table copies in the database system**, wherein **responsive to the type of change being a key update**, the information **associated with the captured change** comprises old key column values, new key column values, new non-key column values, an old **timestamp**, a new **timestamp**, an old copy identification, and a new copy identification **associated with the row of the given table copy** (REFER to claims 17 and 66, wherein these limitations have already been addressed, Jain).

Claims 19 and 68:

Regarding Claims 19 and 68, Jain teaches wherein applying **the communicated change to the other table copies in the database system** comprises:

detecting a conflict for the communicated change with a row of a target table copy, **the target table copy being a table copy among the other table copy in the database system at which changes are to be replicated**;(column 10, lines 8-15, wherein multiple conflicting updates may occur to different copies of replicated data, wherein one transaction, T1, can update one copy of record A, C1, and a second transaction, T2, can update a second copy of record A, C2, if T1 is propagated to C2, T1 can overwrite T2's update and vice versa, wherein the present invention detects this type of execution, Jain);

determining a priority for the communicated change **responsive to the conflict being detected** (column 22, lines 18-22, Jain); and

changing **the row of target table copy** in accordance with the detected conflict and the determined priority for the communicated change (REFER to e2, wherein this limitation has been address, Jain), wherein the changing comprises:

Claims 20 and 69:

Regarding claims 20 and 69, Jain teaches wherein the detecting **a conflict for the communicated change with a row of a target table copy** comprises:

responsive to the type of the communicated change being a row delete (Figure 5C, all features, wherein the change is communicated and wherein diagram 574, delete the row at the remote site, Jain), the conflict is detected **responsive to**,

no row of the target table copy (Figure 5B1, diagram 526, wherein row found at remote site, if no, Jain) with key column values **associated with** the communicated change is identified (Figure 5B1, diagrams 534, wherein corresponding is interpreted to be matching column level, Jain); **or**

for a row of the target table copy with key column values matching the key column values **associated with** the communicated change (Figure 5B1, diagrams 536, wherein corresponding is interpreted to be matching row level, Jain):

a **timestamp associated with** the row of the target table copy does **not** match the **timestamp associated with** the communicated change (Figure 5B1, diagrams 534, wherein no, is interpreted to be not matching, Jain); **or**

a copy identification of the row of the target table copy does **not** match a copy identification **associated with** the communicated change (Figure 5B1, diagrams 536, wherein no, is interpreted to be not matching, and wherein matching is interpreted to be a method of corresponding, Jain).

Claims 21 and 70:

Regarding claims 21 and 70, Jain teaches wherein detecting a **conflict for the communicated change with a row of a target table copy** further comprises:

responsive to the communicated type of the communicated change being a row insert, the conflict is detected (columns 22-23, line 67 and lines 10-14, wherein conflict is detected and wherein modifications includes the update, delete, and insert operations, Jain) **responsive to**,

a row of the target table copy with key column values matching key column values **associated with** the communicated change is identified (Figure 5B1, diagrams 536, wherein corresponding is interpreted to be matching row level, Jain).

Claims 22 and 71:

Regarding claims 22 and 71, Jain teaches wherein detecting a **conflict for the communicated change with a row of a target table copy** further comprises:

responsive to the type of the communicated change being a non-key update_ (REFER to claims 10 and 59, wherein this limitation has been addressed, Jain), the conflict is detected **responsive to:**

no rows of the target table copy with key column values matching key column values of the communicated change is identified (Figure 2D1, all features, wherein before replication is defined and illustrates Database A and Database B, and wherein the rows aren't matched, Jain); **or**

for a row of the target table copy with key column values matching the key column values **associated with** the communicated change (Figure 2D1, all features, wherein after DBB=> DBA replication is illustrated, and Database B, before the replication and Database A, after replication have the same column values, i.e. matches, and wherein the headings of item and quantity on hand are identified, the rows are matched, Jain):

timestamp associated with the row of the target table copy does **not** match an old **timestamp associated with** of the communicated change (Figure 2D1, all features, wherein after DBB=> DBA replication is illustrated, Database A and Database B, wherein widget is interpreted to be the monotonic number, wherein the numbers aren't the same, Jain); **or**

a copy identification of the row of the target table copy does **not** match old copy identification **associated with** the communicated charge (Figure 2D2, all features, wherein AFTER DBA=>DBB replication is illustrated, and wherein Database A is interpreted to be the old copy, and Database B is interpreted to be the copy identification of the row of the target table copy, wherein the rows are different, i.e. site indicates DB_A and DB_B, Jain).

Claims 23 and 72:

Regarding claims 23 and 72, Jain teaches wherein detecting a **conflict for the communicated change with a row of a target table copy** further comprises;

responsive to the type of the communicated change being a key update, the conflict is detected **responsive to**, no row of the target table copy with key column values matching old key column values of **associated with** the communicated change is identified (Figure 2D1, all features, wherein before replication is illustrated as well as defined, Database A and Database B, the row table aren't matched nor is the communicated change, interpreted to be wherein the inventory columns are identified, Jain); **or**

for a row of the target table copy with key column values matching the old key column values **associated with** the communicated change (column 18, lines 1-8 and Figure 2D1, all features, wherein before replication is defined and illustrates Database B and after DBB=>DBA replication, wherein Database B is defined, the row communicated, wherein the modifications are matched in the local to the remote sites and Database B, Jain):

a **timestamp associated with** of the row of the target table copy does **not** match an old **timestamp associated with** the communication change (column 10, lines 11-15 and Figure 2D1, all features, wherein after DBB=> DBA replication is illustrated, Database A and Database B, wherein widget is interpreted to be the monotonic number, wherein the numbers aren't the same, Jain); **or**

a copy identification **associated with** the row of the target table copy does **not** match an old copy identification **associated with** the communicated change (Figures 2B, diagrams 120 and 130 and Figure 2C, diagrams 120 and 130 further defined in column 18, lines 53-57, wherein a decrease in inventory by the quantity ordered and entry is inserted in the orders tables to retain information and replicated, i.e. in Figure 2C and Figure 2D2, all features, wherein AFTER DBA=>DBB replication is illustrated, and wherein Database A is interpreted to be the old copy, and Database B is interpreted to be the copy

identification of the row of the target table copy, wherein the rows are different, i.e. site indicates DB_A and DB_B, Jain); or

a row of the target table copy with key column values matching new key column values **associated with** the communicated change is identified (Figure 2D1 all features, wherein DBB=>DBA, illustrates a row, wherein DB_B is communicated to Database A and column 18, lines 1-8, Jain).

Claims 24 and 73:

Regarding claims 24 and 73, Jain teaches wherein the **communicated change to the other table copies in the database system** comprises:

assigning priority to the communicated change (columns 10-11, line 65-67 and lines 1-5, Jain), **responsive to no conflict being detected between the communicated change and the row of the target table copy** (Figure 9B, diagram 920, wherein whether or not a discrepancy is detected or not, further defined in column 19, lines 56-57, Jain).

Claims 25 and 74:

Regarding claims 25 and 74, Jain teaches wherein the determining comprises:

assigning priority to the communicated change **responsive to the type of the communication change being** a row insert (column 13, lines 21-22, wherein modification entry is inserted in replication tables, Jain);

and

timestamp associated with of the communicated change is greater than a **timestamp associated with** the conflicting row in the target table copy (columns 18-19, lines 65-67 and lines 1-2, Jain); or

timestamp associated with of the communicated change is equal to the **timestamp associated with** of the conflicting row (column 16, lines 24-28, wherein the field value, interpret to be monotonic number, is equal to its corresponding old value parameter and column 18, lines 8-10, Jain), and a copy identification **associated with** the communication change is greater than a copy identification **associated**

with the conflicting row (column 10, lines 8-15, wherein conflicting updates may occur to different copies of replicated data, and wherein one transaction, T1, can update one copy of record A, C1, and a second transaction can update a second copy of record A,C2, and if T1 is propagated to C2, T1 can overwrite T2 and vice versa, Jain).

Claims 26 and 75:

Regarding claims 26 and 75, Jain teaches wherein determining a **priority for the communicated change** comprises:

assigning priority to the communicated change (REFER to claims 24 and 73, wherein the limitation has been addressed, Jain) **responsive to the type of the communicated change being a row delete** (column 14, lines 22-26, Jain) and **responsive to**, no row in the target table copy matches key column values **associated with** the communicated change (column 16, lines 15-19, wherein the not equal to it's corresponding value and Figure 2D1, all features, wherein before replication is defined and illustrates Database A and Database B, and wherein the rows aren't matched, Jain); **or**

timestamp associated with of the communicated change is greater than a **timestamp associated with** the conflicting row in the target table copy (columns 18-19, lines 65-67 and lines 1-2, Jain); **or**

the **timestamp associated with** for the communicated change is the same as the **timestamp associated with** for the conflicting row and a copy identification **associated with** the communication change is greater than a copy identification of the conflicting row (column 18, lines 8-10, Jain), and a copy identification of the communication change is greater than a copy identification **associated with** the conflicting row (column 10, lines 8-15, wherein conflicting updates may occur to different copies of replicated data, and wherein one transaction, T1, can update one copy of record A, C1, and a second transaction can update a second copy of record A,C2, and if T1 is propagated to C2, T1 can overwrite T2 and vice versa, Jain).

Claims 27 and 76:

Regarding claims 27 and 76, Jain teaches wherein determining a **priority for the communicated change** comprises:

assigning priority to the communicated change (REFER to claims 24 and 73, wherein the limitation has been addressed, Jain) **responsive to the type of the communicated change is being** a non-key update (column 17, lines 58-59, wherein concurrent updates can be made to non-primary key columns, Jain) and **responsive to,**

no row in the target table copy matches key column values **associated with** the communicated change (Figure 2D1, all features, wherein before replication is illustrated as well as defined, Database A and Database B, the row table aren't matched nor is the communicated change, interpreted to be wherein the inventory columns are identified, Jain); or

a **timestamp associated with** the communicated change is greater than a **timestamp associated with** the conflicting row in the target table copy (columns 18-19, lines 65-67 and lines 1-2, Jain); or

the **timestamp associated with** of the communicated change is the same as the **timestamp associated with** of the conflicting row and a copy identification **associated with** the communicated change is greater than a copy identification **associated with** the conflicting row (column 10, lines 8-15, wherein conflicting updates may occur to different copies of replicated data, and wherein one transaction, T1, can update one copy of record A, C1, and a second transaction can update a second copy of record A, C2, and if T1 is propagated to C2, T1 can overwrite T2 and vice versa, Jain).

Claims 28 and 77:

Regarding claims 28 and 77, Jain teaches wherein determining a **priority for the communicated change** comprises:

assigning priority to the communicated change **responsive to the type of the communicated change** (Figure 6, all features wherein the first call is interpreted to be priority and columns 10-11, line

65-67 and lines 1-5, Jain) **being** a key update (Figure 7A, diagram 714, wherein the queue_call_args in Figure 6, diagram 618, continues onto Figure 7, wherein the arguments are executed and column 12, lines 6-11, wherein the parameter is updated shown in Figure 7A, diagram 714, Jain) and **if**:

no row in the target table copy matching old key column values **associated with the** communicated change is identified (Figure 2D1, all features, wherein before replication is illustrated as well as defined, Database A and Database B, the row table aren't matched nor is the communicated change, interpreted to be wherein the inventory columns are identified, Jain), and

no row in the target table copy matching new key column values **associated with the** communicated change is identified (Figure 2D1, all features, wherein after DBB=> DBA replication is illustrated, and Database B, before the replication and Database A, after replication have the same column values, i.e. matches, and wherein the headings of item and quantity on hand are identified, the rows are matched, Jain); **or**

a new **timestamp associated with** of the communicated change is greater than a **timestamp associated with** for the conflicting row in the target table copy (columns 18-19, lines 65-67 and lines 1-2, Jain) with key column values matching new key column values of **associated with** communicated change (Figure 2D1 all features, wherein DBB=>DBA, illustrates a row, wherein DB_B is communicated to Database A and column 18, lines 1-8, Jain), **or**

the new **timestamp and copy identification associated with** of the communicated change matches the **timestamp** (column 4, lines 18-21, Jain) and a copy identification **associated with the** conflicting row in the target table copy with key column values matching new key column values **associated with** the communicated change, respectively (column 4, lines 23-31, wherein the procedure-level replication modifies a remote site based on the logical operations used to modify data at the originating site, and wherein a procedure-level replication provides the ability to identify conflicting updates and the same logical operations performed on one copy of a data item can be propagated to all

other copies of the same data item and information concerning conflicts identified by the present invention can be retained in the replication tables, Jain); or

an old **timestamp associated with** the communicated change is greater than the **timestamp associated with** the conflicting row in the target table copy with key columns matching old key column values **associated with** the communicated change (column 18, lines 1-8 and Figure 2D1, all features, wherein before replication is defined and illustrates Database B and after DBB=>DBA replication, wherein Database B is defined, the row communicated, wherein the modifications are matched in the local to the remote sites and Database B, Jain); or

the **timestamp associated with** the communicated change matches the **timestamp associated with** the conflicting row and an old copy identification **associated with** the communicated change is greater than the copy identification (column 10, lines 8-15, wherein conflicting updates may occur to different copies of replicated data, and wherein one transaction, T1, can update one copy of record A, C1, and a second transaction can update a second copy of record A, C2, and if T1 is propagated to C2, T1 can overwrite T2 and vice versa, Jain) **associated with** the conflicting row with key column values matching old key column values **associated with** the communicated change (column 18, lines 1-8 and Figure 2D1, all features, wherein before replication is defined and illustrates Database B and after DBB=>DBA replication, wherein Database B is defined, the row communicated, wherein the modifications are matched in the local to the remote sites and Database B, Jain); and

no row in the target table copy matching new key column values **associated with** the communicated change is identified (REFER to claims 23 and 72, wherein this limitation has been addressed, Jain); or

the new monotonic number of the communicated change is greater than the **timestamp associated with** of the conflicting row with key column values matching the new key column values **associated with** the communicated change (column 18, lines 1-8, wherein a row-level replication

scheme determines that a remote site's current values match old values for all columns in a table entry prior to applying an update at a remote site, wherein the column-level replication checks only those columns that were changed by the original update, i.e. indicated by a difference between the values of the corresponding old and new parameters and if the old. value parameters of the changed columns are equal to their corresponding values at the remote site, the loss of an intermediate update is unlikely, and the update operation can be completed, Jain); or

the **timestamp associated with** of the communicated change matches the **timestamp associated with** of the conflicting row and the new copy identification **associated with** the communicated change is greater than the copy identification **associated with** the conflicting row with key column values matching the new key column values **associated with** the communicated change (column 25-28, wherein all of the field values in the remote table entry are equal to their corresponding old_sub_value parameters processing continues at processing block, Jain).

Claims 29 and 78:

Regarding Claims 29 and 78, Jain teaches wherein changing **the row of the target table copy** comprises:

controlling propagation of the changed applied to the target table copy (column 13, lines 62-64, wherein value changes in the local copy, Jain);

insuring convergence of the **each of table copy in the database system** to the same state (Figure 2B, diagrams 120 and 130 and column 5, lines 45-50, wherein database A and database B contain identical entries and values for each entry, Jain); and

installing the communicated **change** into the target table copy (column 5, lines 56-58, wherein inserting is interpreted to be installing, an entry in the orders table to reflect the order, wherein the process is reflected in Figure 2B, the one and two of the basic transactions illustrated, Jain).

Claims 30 and 79:

Regarding claims 30 and 79, Jain teaches wherein controlling **propagation of the change applied to the target table copy** comprises:

responsive to the type of the communicated change being a row insert, setting a copy identification **associated with** the applied change to the target table copy to a copy identification **associated with** the communicated change (Figure 4, diagram 402, wherein the trigger can check the global variable in the replication procedure or an original procedure, defined in column 13, lines 30-32, and lines 25-32, wherein setting a global variable, i.e. a variable that can be accessed by an trigger or replication, and perform replication is interpreted to be receiving the change, Jain).

Claims 31 and 80:

Regarding claims 31 and 80, Jain teaches wherein controlling **propagation of the change applied to the target table copy** comprises:

responsive to the type of the communicated change being a row delete, updating a row of the target table copy with key column values matching key column values **associated with** the communicated change by setting the delete label to indicate **not** to propagate the applied change (column 16, lines 10-20, wherein the remote table entry is deleted from the remote table, and wherein after the delete operation is performed on the remote table entry, the global replication variable is reset at processing and processing ends, and wherein if, at the decision block, i.e., "should lost updates be prevented, existing modifications should be preserved, processing continues at decision block, and at the decision block i.e., "is each field value in the row equal to its corresponding old_sub_value parameter, and if any of the remote table entry's field values do not equal its corresponding old_sub_value parameter, processing continues at processing block, Jain).

Claims 32 and 81:

Regarding claims 32, and 81, Jain teaches wherein controlling **propagation of the change applied to the target table copy** comprises:

responsive to the communicated change **being** a non-key or key update, setting a copy identification **associated with** the applied change to the target table copy to the copy identification **associated with** the communicated change (Figure 4, diagram 402, wherein the trigger can check the global variable in the replication procedure or an original procedure, column 13, lines 30-32, and lines 25-32, wherein setting a global variable, i.e. a variable that can be accessed by an trigger or replication, perform replication and column 13, lines 54-62, wherein changes are applied to the table, Jain).

Claims 33 and 82:

Regarding claims 33 and 82, Jain teaches wherein insuring **convergence of each table copy in the database system to the same state** comprises:

insuring propagation of an implicit delete change in the target table copy by setting a conflict label of the propagation controls **associated with** the conflicting row when the **type of the** communicated change is a row insert, row delete, or non-key update assigned priority (column 6, lines 53-63, Jain), and a copy identification **associated with** the conflicting row is a copy identification assigned to the target table copy (columns 12-14, lines 62-64, wherein replicate value changes in the local copy can be executed at remote sites to replicate data modifications performed on local data and lines 9-15, wherein identify the row that is the target of the modification, and wherein the old values would be used to detect conflicts, Jain).

Claims 34 and 83:

Regarding claims 34 and 83, Jain teaches wherein insuring **convergence of each table copy in the database system to the same state** comprises:

insuring propagation of a delete change in the target table by setting a conflict label of the propagation controls **associated with** the conflicting row (column 15, lines 10-20, wherein check is done to see if modification has been made, and wherein current update operation might be erased is the update is performed on remote data, and so forth, Jain) with key column values matching old key column values **associated with** the communicated change (Figure 5B1, diagrams 534, wherein corresponding is interpreted to be matching column level, Jain), when the **type of the** communicated change is a key update assigned priority (Figure 5B1, diagrams 544, wherein update the row such that each filed value is updated with its corresponding new value, Jain), and a copy identification **associated with** the conflicting row matches a copy identification assigned to the target table copy (columns 12-14, lines 62-64, wherein replicate value changes in the local copy can be executed at remote sites to replicate data modifications performed on local data and lines 9-15, wherein identify the row that is the target of the modification, and wherein the old values would be used to detect conflicts, Jain); and

insuring propagation of a delete change in the target table copy by setting a conflict label of the propagation controls **associated with** the conflicting row with key column values matching new key column values **associated with** the communicated change, when the **type of the** communicated change is a key update assigned priority, and a copy identification **associated with** the conflicting row is a copy identification assigned to the target table copy (REFER to claims 34 and 83, wherein the following limitations have been addressed, Jain)

Claims 35 and 84:

Regarding claims 35 and 84, Jain teaches wherein insuring **convergence of each table copy in the database system to the same state** comprises:

recording communicated old key column values, an old **timestamp**, and an old copy identification **associated with** a conflicting change in the target table copy in a delete tombstone, when **type of the** communicated change is a conflicting delete or a conflicting update with conflicting

communicated old **timestamp** or copy identification (column 20, lines 11-13, wherein save point is defined and interpreted to be a method of recording, column 21, lines 46-49, wherein a save point is being established, Jain).

Claims 36 and 85:

Regarding claims 36 and 85, Jain teaches wherein insuring **convergence of each table copy in the database system to the same state** comprises:

checking for matching delete (column 21 lines 4-8, Jain) and suppressing application of the communication change (Figure 11A2, diagram 1128, and column 20, lines 9-16, wherein modifications can be undone, Jain) **responsive to** a delete tombstone matching the new key columns (Figure 11A2, diagram 1127 and column 20, lines 60-64, wherein if they are equal, Jain), new **timestamp**, and new copy identification **associated with** the communicated change **being found** (column 19, lines 57-63, Jain), when the **type of the** communicated change is an insert change **or** an update change with a conflicting insert assigned priority (column 18, lines 54-57, wherein entry is inserted reflection change in decrease, Jain).

Claims 37 and 86:

Regarding claims 37 and 86, Jain teaches reporting each conflicting change (column 10, lines 4-15, wherein exceptions table is used to store information related to any exceptional or occurrence during executions of a deferred transaction, wherein one transaction, T1, can update one copy of record A, C1, and a second transaction, T2, can update a second copy of record A, C2. If T1 is propagated to C2, T1 can overwrite T2's update, and vice versa, detects this type of exception, and others, and retains information for each exception, Jain).

Claims 38 and 87:

Regarding claims 38 and 87, Jain teaches wherein reporting **each conflicting change** comprises:

reporting conflicting changes of a row delete, a row insert, or a non-key update change only when priority is not assigned to the communicated change (Figure 6, diagram 601, wherein the first call isn't assign, wherein no is identified, Jain); and

a copy identification **associated with** a conflicting row in a target table copy is the copy identification assigned to the target table copy (columns 12-14, lines 62-64, wherein replicate value changes in the local copy can be executed at remote sites to replicate data modifications performed on local data and lines 9-15, wherein identify the row that is the target of the modification, and wherein the old values would be used to detect conflicts, Jain).

Claims 39 and 88:

Claims 39 and 88, Jain teaches wherein reporting **each conflicting change** comprises:

reporting conflicting changes of a key update change only when priority is not assigned to the communicated change (REFER to 35 and 84, wherein this limitation has been addressed, Jain); and

a copy identification **associated with** a conflicting row in a target table copy with key column values matching old key column values **associated with** the communicated change is the copy identification assigned to the target table copy (column 22, lines 7-14, wherein old and new values as part of its parameters, a potential conflict can be detected by comparing the old values of the row at the original updating site with the current value of the row at the targeted site for the replicated modification, and wherein the values are different, a conflict exists between the local and remote data copies, Jain); or

a copy identification **associated with** a conflicting row with key column values matching new key column values **associated with** the communicated change is the copy identification assigned to the target table copy (column 22, lines 13-22, wherein if the values are different, a conflict exists between the local and remote data copies, wherein the order processing example described includes a error detection, wherein the order processing for example, the place order remote process includes examination of the

local and remote copies of the order status and the ability for an application to identify conflicts within one of its procedures, Jain).

Claim 40:

Regarding Claim 40, Jain teaches wherein **a plurality of nodes each node having a corresponding copy of a table** (see abstract, Jain), wherein each row of **each table copy includes:**

a timestamp with the row indicating a time when a change to the row has occurred (Figure 10, wherein commit time is defined and wherein, commit is interpreted to be the point in a transaction when all updates to any resources involved in the transaction are made permanent, Jain);

a copy identification to the row, the copy identification being an identifier that uniquely identifies the table copy to which the row belongs (Refer to claim 1, wherein this limitation has already been addressed, Jain); and

propagation controls with the row, the propagation controls indicating whether a change to the row should be communicated to other table copies based at least in part on the timestamp of the change or the copy identification associated with the row (Refer to claim 1, wherein this limitation has already been addressed, Jain);

a mechanism to asynchronously capture a change to a row of a given table copy in the database system from a database recovery log, the database recovery log containing an entry that describes the change to the row of the given table copy (Refer to claim 1, wherein this limitation has already been addressed, Jain) **the database recovery log containing an entry that describes the change to row of the given table copy;**

a message queue for communicating the captured change to other table copies in the database system (column 4, lines 1-4 and lines 14-15, Jain); and

a mechanism to **apply** the communicated **change** to the **other** table copies in the **database system**, wherein **each table copy in the database system converges** to a same state (Refer to claim 1, wherein this limitation has already been addressed, Jain).

Prior Art of Record

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure

1. Jain et al (US Patent No. 5,806,075) discloses the ability to replicate modifications made at a local site to multiple remote sites in a peer-to-peer environment.
2. Stamos et al (US Patent No. 6,058,401) disclose communication costs are reduced in a distributed system that supports data replication with conflict detection by sending small values or nulls as replacements for filed values that are not strictly used for replication or conflict detection.
3. Shih et al (US Patent No. 6,615,213) discloses a method and mechanism for data replication.
4. Hass et al. (US Patent No. 4,631,673) discloses a method for refreshing multicolumn tables in a relational database and provides a method for refreshing the snapshot i.e., a read-only copy of a base table portion, and each record of a base table must have: (1) a tuple (i.e., unique) identifier TID, (2) the previous records TID, PREVTID, and (3) "time stamp," UID, of the records last alteration.
5. Boyle (US Patent No. 4,646,229) discloses a database system that includes future versions of the database for use in time-oriented applications such as an application for scheduling the use of the same facilities to present and future users.
6. Gallant (US Patent No. 4,648,036) discloses a method for controlling query and update processing in a database system

7. Ecklund (US Patent No. 4,853,843) discloses a multi-version database where each update operation creates a new version of the database, and the older versions remain available and a method for deriving a minimal set of alternative version paths and system for merging multiple versions of a data object into a distributed database such that each updating partition can access its own version.

Response to Arguments

1. Applicant argues prior fail to teach, "*asynchronously capturing a change to a row of a given table copy from a database recovery log*".

Examiner respectfully disagrees, wherein applicant argues an **amended claim**. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., *asynchronously capturing a change to a row of a given table copy from a database recovery log*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the

THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

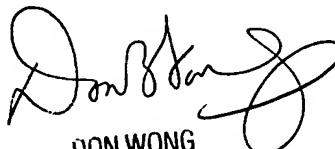
Point of Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helene R. Rose whose telephone number is (571) 272-0749. The examiner can normally be reached on 8:00am - 4:30pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Helene R Rose
Technology Center 2100
September 22, 2006


DON WONG
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